

C L A I M S

[1] A nonaqueous electrolyte secondary battery including a negative electrode containing a graphite material as the negative active material, a positive electrode containing lithium cobalt oxide as a main component of the positive active material and a nonaqueous electrolyte solution, said battery being characterized in that said lithium cobalt oxide contains a group IVA element and a group IIA element of the periodic table and said nonaqueous electrolyte solution contains 0.2 - 1.5 % by weight of a sulfonyl-containing compound.

[2] The nonaqueous electrolyte secondary battery as recited in claim 1, characterized in that, in said positive active material, said group IVA element is zirconium and said group IIA element is magnesium.

[3] The nonaqueous electrolyte secondary battery as recited in claim 1 or 2, characterized in that said nonaqueous electrolyte solution further contains 0.5 - 4 % by weight of vinylene carbonate.

[4] The nonaqueous electrolyte secondary battery as recited in any one of claim 1 - 3, characterized in that said sulfonyl-containing compound is at least one of 1,4-butanediol dimethanesulfonate and divinyl sulfone.

[5] The nonaqueous electrolyte secondary battery as recited in any one of claim 1 - 4, characterized in that said nonaqueous

electrolyte solution contains, as said sulfonyl-containing compound, 1,4-butanediol dimethanesulfonate in the amount of 0.5 - 1.5 % by weight.

[6] The nonaqueous electrolyte secondary battery as recited  
5 in any one of claim 1 - 5, characterized in that said nonaqueous electrolyte solution contains, as said sulfonyl-containing compound, divinyl sulfone in the amount of 0.2 - 0.5 % by weight.

[7] The nonaqueous electrolyte secondary battery as recited  
in any one of claim 1 - 6, characterized in that said nonaqueous  
10 electrolyte solution contains, as a solvent, diethyl carbonate.

[8] The nonaqueous electrolyte secondary battery as recited  
in any one of claim 1 - 7, characterized in that said positive  
active material and negative active material are contained such  
that a ratio in charge capacity of the negative electrode to  
15 the positive electrode is 1.0 - 1.2 when an end-of-charge voltage  
is prescribed at 4.3 V.

[9] The nonaqueous electrolyte secondary battery as recited  
in any one of claim 1 - 7, characterized in that said positive  
active material and negative active material are contained such  
20 that a ratio in charge capacity of the negative electrode to  
the positive electrode is 1.0 - 1.2 when an end-of-charge voltage  
is prescribed at 4.4 V.

[10] A nonaqueous electrolyte solution, for use in a nonaqueous  
electrolyte secondary battery including a negative electrode  
25 containing a graphite material as the negative active material,

a positive electrode containing lithium cobalt oxide containing a group IVA element and a group IIA element of the periodic table as a main component of the positive active material and a nonaqueous electrolyte solution, characterized as containing

5 0.2 - 1.5 % by weight of a sulfonyl-containing compound.